dtfa *An Economic Development Agency*

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Commission's Secretary, Marlene H. Dortch,
Office of the Secretary, Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

RE: Comments – NBP Public Notice # 7
        GN Docket Nos. 09-47, 09-51, and 09-137

Dear Chairman and Commissioners:

We recognize that this request for comment from the FCC comes as one in a series of comments and notices of inquiry designed to assist the FCC in developing a coherent and sustainable National Broadband Plan ("NBP") for which the DTFA has commented previously.

I am the consulting attorney for the Dixie Technology Funding Agency ("DTFA") an economic development agency located in La Verkin, Utah. Mayor Karl Wilson of La Verkin has asked me to respond further in considering this new request for comment, NBP Public Notice #7, released September 25, 2009.

In this submission the DTFA will be further discussing the vision and the first-of-its-kind Real-Time Community Mobile IP network as it pertains to areas of Government – at all levels – and how a special purpose local government or tribal entity can affect broadband deployment and adoption through interaction with its citizens using local access Community Mobile.

1. E-government and Civic Engagement (Understanding the Innovation).

NOTE: The DTFA would ask that the readers of this comment to first review the DTFA's public Request for Information (RFI) which was issued on October 19, 2009 (http://www.laverkincity.org, click on economic development) .

The DTFA has submitted similar comments previously under GN Docket Numbers 09-51 and 09-157.

There have been many wonderful advancements in technology over just the last few years and we can expect technology to advance exponentially (not just incrementally)

over at least the next few years.[1] The tendency, however, for businesses and government to jump in ahead of the curve in technology, yet falling behind the curve in actual business structure has been the primary cause of failure and wasteful spending in broadband that has hit state, tribal and local governments the hardest.

a. Primary Needs that Broadband Can Help Address in Federal, State, Tribal, and Local Government.

Defining "Broadband"

Understanding innovation means that the FCC must first instill in its people the desire lose the old and limited definition for term "broadband" meaning simply "high speed internet"[2] and instead adopt the more accurate and innovative definition meaning "providing large bit-rate two-way data transmissions."[3]

We all must first understand that the term "internet" is merely a service that has developed on the back of data communications infrastructure (i.e. the telephone wires, overseas cabling, satellite communications, fiber optics, and wireless, to name a few). Limiting ourselves to only one service on that communications infrastructure really limits the business opportunities for Broadband. The differences may at first seem insignificant (the difference between "internet" and "two-way data transmission") but the limiting factor of only considering internet has indeed limited the scope for development in these areas.

A key example of broadband development that does not involve the internet directly, but can affect government or community life is something we call "local access" digital television or DTV. Previously digital TV stations have all been either "signal" based TV such as your local ABC, NBC, CBS, and Fox affiliates – or they have been using the Internet for "IPTV" to deliver only limited and low quality access.

But with the advent of local "wireless" broadband and the new segmented capacities, we see real opportunities and capability for local "wireless" digital-tv access to operate either independently or along side of the local digital "signal" based tv stations. Local "wireless" digital-tv will provide a much higher level of consumer interaction than what was possible with only "signal" based tv stations.

These new communication pathways will in-turn spawn new markets and new growth which we have not seen before. Our State, local and tribal governments must take the lead in getting us out of the internet cloud and into the new pervasive computing cloud. The DTFA cannot stress

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[1] Moore's Law describes a long-term trend in the history of computing hardware, in which the number of transistors that can be placed inexpensively on an integrated circuit has improved at (roughly) exponential rates. Moore's law has also been taken to precisely describe a driving force of technological and social change that is not expected to stop until 2015 or even later. The law is named for Intel co-founder Gordon E. Moore. It has since been used in the semiconductor industry to guide long term planning and to set targets for research and development.

[2] See FCC Consumer Facts, *"What is Broadband", http://www.fcc.gov/cgb/consumerfacts/highspeedinternet.html*

[3] COMMENT SOUGHT ON DEFINING "BROADBAND" NBP Public Notice #1, GN Docket Nos. 09-47, 09-51, 09-137.

enough the importance of understanding that the bandwidth hogs of high definition (HD) media must be handled on the local access level with all the "segmented capacity" gates on the local access side with all the caching capabilities and other optimizations that will ensure quality of service (QOS).

Out of The Internet Cloud and Into the Pervasive Cloud
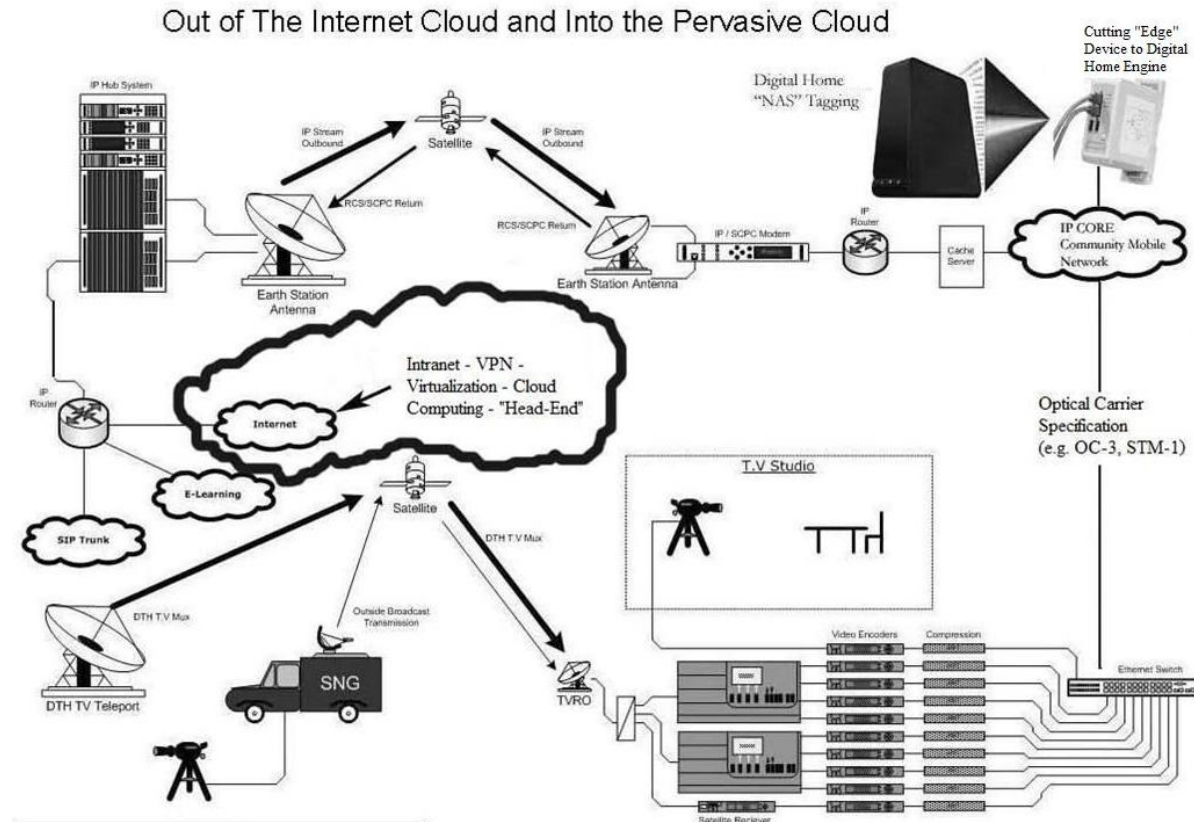
Cloud computing is a paradigm of computing in which dynamically scalable and often virtualized resources are provided as a service. Users need not have knowledge of, expertise in, or control over the technology infrastructure in the "cloud" that supports them. The concept generally incorporates combinations of the following: infrastructure as a service (IaaS); platform as a service (PaaS) or software as a service (SaaS).

You can see from the diagram above that in true "cloud" computing, the internet need only be the global authorization service, but then the paths for high bandwidth data delivery can be directed and scaled properly through completing the two-way digital communications loop on the local access level.

The internet is just one little cloud that fits within the bigger picture of the entire communications infrastructure. One can easily draw many paths for "two-way data transmission" that do not necessarily involve the internet. Once the internet is used to establish the local asset requiring the data transmission and then authorizing the

transmission, it is the "segmented capacities" infrastructure that can best be utilized to deliver large file size digital data packets to the respective receiving entities to complete the two-way digital communication.

Governmental broadband initiatives must begin to utilize the Community Mobile segmented capacity models if we are to truly address the employment, literacy, public safety, open government, physical plant, health, education needs of tomorrow.

b. Empirically Demonstrable Benefits or Harms of Federal, State, Tribal, or Local Broadband Solutions Generally

The benefits of broadband in increasing communications are clear – the great freedom train cannot be stopped when people are informed, educated, and self sufficient. These benefits are empirically demonstrable in some developing foreign nations where freedom of information cannot be stopped by governments. Technology will raise student test scores and active involvement in the community and government will result.

The great harm, on the other hand, in government broadband solutions has been their tendency to franchise to only one provider and thereby lock out both competition and innovation. There are already many fair competitive advantages for limited monopoly existing for service providers within Federal and State law which innovative new industries can take advantage of, such as patents, trademarks, copyrights, and trade secrets, just to name a few. The local telecommunications franchise simply needs to be done away with. Our State, local and tribal governments need to instead be focused on nurturing competition rather than limiting it. Creating and enforcing new federally mandated policy in "open" broadband infrastructure is by far the best path to economic development through telecommunications.

c. Broadband Solutions Underutilized by Government to their Detriment

City wide real-time wireless broadband coverage for most public areas for public safety is perhaps one of the most underutilized broadband solutions. City wide wireless has been technologically ready for some time, but it has been the lack of innovative business models that has prevented success in these areas.

Perhaps, the major stumbling block to utilizing full time digital surveillance has been due to an irrational fear of "big brother is watching you." Surveillance of public places is just that – public places – and the fear of incursions into private property or personal privacy are just unfounded. Misuse of technology, compared to the mere existence or availability of technology, are two very different topics. People should not fear technology advancement itself; they should merely fear the establishment of improper policies that would infringe upon privacy or upon the rights to open competition.

A robust "Multiple Carrier Community Mobile" system will enhance and ensure efficiency, portability, and security, with reduced costs of implementation to create ubiquity in high definition video as well as in mobile and wearable technologies. Heavy encryption used in these technologies will increase privacy controls and not diminish them. Ubiquitous availability of high definition video can also promote remote classroom education and child safety. Wearable location ID and health monitoring systems, for example, when integrated into a Community Mobile Cloud environment, will increase safety, access, functionality, data available to support early detection. Where privacy is a concern, network architecture can ensure that only those who need the information can obtain the information.

With this change in paradigm for wireless networks we will expect to see even further advancements in MIMO "subnetting" technology, micro-fabrication, integration of physical sensors with embedded microcontrollers and microchip interfaces engendering a whole new generation of even more advanced wireless sensors suitable for many applications, such as stroke monitoring, surgery rehabilitation, myocardial infarction detection, or even prevention of traumatic brain injury.

Real-time remote classroom interfaces with broadband will allow a higher quality for distance learning (as well as distance teaching) i.e. multiple students with laptops in multiple locations can reach one instructor with two-way high definition audio and video, while conversely one instructor in a remote location could be piped into large K-12, STEM and NCLB class room settings or auditoriums simultaneously.

Community Colleges, Universities, Libraries, Hospitals, Health Clinics, and others can have improved skills, awareness, and education. Capabilities for city wide connected real-time video surveillance in public areas can ensure early detection and prevention of crime. More solid state data storage, in more public places, will allow police officers, for example, to access to both stored and real-time video of a select location, and in the instance of a crime like child abduction, this in turn would stimulate crime prevention as well as crime deterrence.

2. Government broadband initiatives.

a. Government Initiatives to Increase Broadband Deployment and Adoption

In the wake of the 1984 break up of the Bell Systems, even today many of the monopolistic business models continue to create barriers to openness. For telecommunications systems like we are proposing, although new breakthroughs in wireless technology are important, the DTFA came into existence not to fill the technology gap, but to fill the open model business gaps.

The DTFA recognized that too many of the communities entering into "muni-wi-fi" agreements still do so upon negotiated "franchised" internet services. The DTFA wished to pioneer a new paradigm where local side access services could become self-sustaining and the the keys to development were not found in the franchised internet

services alone. We saw the internet, not as the starting point, but only just one possible service among many. Local access services means opportunity in media, distance learning, security and surveillance, mobile health monitoring, public safety, public information, commerce, mobile maintenance, finance, banking, and literally hundreds of other industries.

Rural areas in particular suffered from the old Bell Systems mentality of treating communications as a scarcity rather than abundance.   In geographic areas where it was hard to lay cable or fiber, the initiatives by local and tribal governments never had the value proposition needed to present to the big telecommunications giants. Communications to the sparsely populated areas of our country were consistently told – it was "merely a matter of time." Well the time for others to come to the rescue of the rural communities seems to have passed and it is now time for rural communities to begin to choose their own destinies.

Mobility then became the ice breaker. Mobility has brought an end to that problem of value. We see that the citizens of the large populated areas in our states and counties like to visit and vacation in the rural areas, thereby creating that demand for the large mobile and wireless companies to provide at least service coverage in these rural areas.

Now that the metaphorical technology "cat" is out of the bag, where these 3G and 4G networks break the ice in the mobile broadband possibilities, the DTFA initiatives are not about creating the new technology, but merely showing how the technology makes for new local services with new economic possibilities.

The DTFA came to fruition in March 2007 with the purpose of removing the "hype" from municipal wi-fi and started to build a new "Community Mobile" paradigm. Because more and more competing resources can be made available to the project through outsourcing, a Director of Contracts ("DOC") organizational scheme was chosen as the best structure when it came to fast-paced technology. The old adage of bigger is better simply did not apply. The Dixie Technology Funding Agency DOC has a track record which has demonstrated great accomplishment. The key to the success and sustainability in a complex project has been the DOC small organizational operating unit.

Though small, a DOC allows for the greatest flexibility in keeping up with all the available technology resources. We know that technology is constantly changing at an alarming pace. The likelihood of a specific technology becoming outdated even before its implementation is becoming common place. Regulatory implementations usually follow. A DOC is the most agile form of organization to be able to jump ―on and not necessarily ―ahead of the curve through nurturing involvement during the entire development process, which created the greatest amount of benefit for the costs.

b. Ability to Replicate

The key to understanding why some new technologies survive in the market place and others do not is also the key to staying ―ahead of the curve (see chart below). Successful organizations do not get caught jumping onto every new trend before it is sustainable. The "knowing when" is the result of monitoring, nurturing, and understanding exactly how validity and marketability occur. A successful and agile organization is able to jump on and not necessarily ahead of the curve through nurturing involvement during the entire development process.

Local Government Entity ("LGE") Technology Nurturing
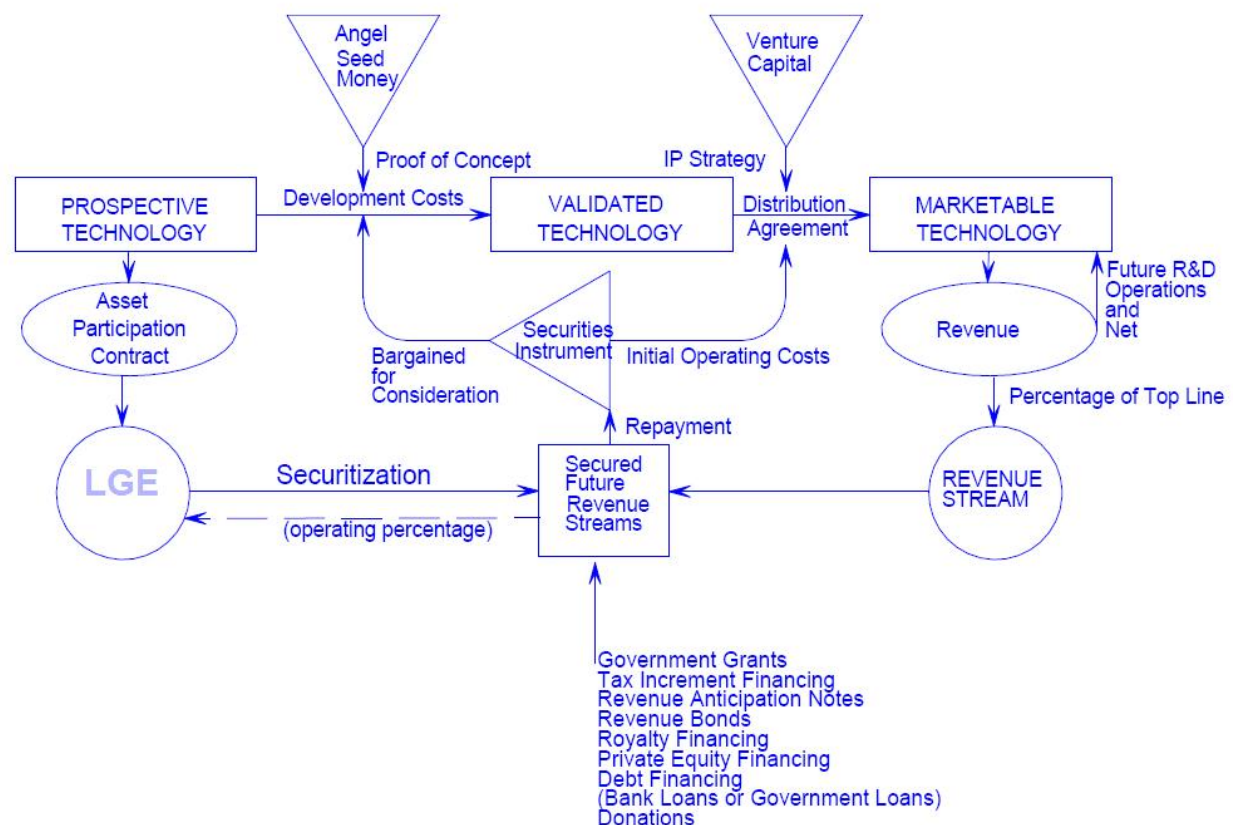
The DTFA DOC is a two person management team with administrative support. The DTFA oversight, through its board of directors, is the exact same as the municipal board (or City Council). Upon formation of the entity, the City Council received training in exactly how to be a member of a corporate entity board. Fortunately, most elected government officials have had prior experience. The first order of business was to create a DOC management team so that the board could actually relinquish all day-today operations to the management team. Manager-managed rather than director-managed prevented the board from interfering with the day-to-day management yet allowed the DOC to do its job within the framework set by the board.

The top row of the above chart shows the traditional path to new technology development. First, a prospective technology is found; then through either angel funding or self investment

(bootstrapping) funds the efforts to create a working validated technology asset. Next venture funding is sought through the investment communities like VCs or partnering. These companies traditionally go through several rounds of funding until ultimately there is a wide market base established and "exit strategies" to sell out to larger companies or initial public offering are usually exercised where success is achieved.

The DTFA sought to find a way for local or tribal governments to provide both nurturing and sustainability for these new technologies. The Asset Participation Contract is a long existing, but often underutilized mode for establishing the "agency" for the local government to help in the creation of municipal securities instruments with the added business leverage to help both encourage the technology and assist in its development. It was through this model that we were able to encourage technology providers to look to our City to build a first of its kind Community Mobile test network.

c. Aggregating Demand with Sustainability

Imagine you are driving into a Community Mobile Cloud city or rural community for the first time. Also imagine you are on business, so you have your laptop with you and you turn it on to begin "scouting" out any local wireless hotspots you might use to connect to the internet to check your email and get online for your business needs.

Instead of finding a hotspot connection, you find a whole new "local access" network complete with high definition local access tv, community information, and a wide variety of premium service offerings from high speed internet, to cable tv channels, to e-commerce portals. If you like just the local access services, you continue to have them for free and unlimited. If you need connection, however, to the world-wide-web and if you are happy with a basic high-speed internet connection, you have the one-day free pass to try it out. If you are staying for more than a day, you might consider subscribing to a premium internet connection service package or maybe even a tv channel package. There are any number of other media or service packages you can choose from. This Community Mobile business architecture actually creates the sandbox in which many new industries can play and develop and grow – and at fiber like speeds without lacking the mobility, the consumer has a real quality of service experience without limitations.

Now, imagine that you are not a traveler, but that you live in this same community. You may already have a high speed internet connection in the home and then you likely already have a wireless residential gateway with a Linksys, D-link, NetGear, or other wireless router so you can communicate from your laptop to your desktop, network area storage, or even a file server/media server within the home.

What the Community Mobile business architecture allows for is that both technologically sophisticated and unsophisticated consumers have each just as much to gain as the other from adopting onto the Community Mobile "cloud" computing. With an HDA (home digital agent) gateway added to the home, that sophisticated and connected user can now simply take her residential gateway with her on the road. She need not have to buy any other services, like an internet connection for example, because through the Community Mobile network, she already has a connection to her home, which in turn already has a connection to the internet. Again, the

multiple carrier mesh block controller (MBC) approach to ubiquitous interconnectivity allows for people to choose only the services they need – if and when they need them. But ubiquitous connectivity also allows for service providers to market even more services to those same consumers without limitations.

Internet access is already available at every hospital, school, and health care facility in practically every city in the entire United States. Any proposed program which offered only internet connections to those institutions, could not deliver any enhancements. A robust "Multiple Carrier Community Mobile" system, on the other hand, will enhance and ensure efficiency, portability, and security, with reduced costs of implementation, to create ubiquity in mobile and wearable technologies. These mobile and wearable technologies can then be used in health-care, online and remote classroom education, and in child safety.

Wearable location ID and health monitoring systems, for example, when integrated into a Community Mobile Cloud environment, will increase safety, access, functionality, data available to support early detection. With a fully IP core Wi-Fi enabled mobile phone, PDA, or bracelet technology, the location of children or patients can be quickly determined. If privacy with these monitoring systems is a concern, a fully IP core system with 256 bit encryption can ensure that only those who need the information can obtain the information.

Many patients can benefit from continuous ambulatory monitoring as a part of a diagnostic procedure, optimal maintenance of a chronic condition, or during supervised recovery from an acute event or surgical procedure. The important limitations overcome by Community Mobile that will enable wider acceptance of wearable health monitoring systems are accomplished through the mobile broadband environment created. With this change in paradigm for wireless networks we will expect to see even further advancements in MIMO "subnetting" technology, micro-fabrication, integration of physical sensors with embedded microcontrollers and microchip interfaces engendering a whole new generation of even more advanced wireless sensors suitable for many applications, such as stroke monitoring, surgery rehabilitation, myocardial infarction detection, or even prevention of traumatic brain injury.

Real-time remote classroom interfaces with broadband will allow a higher quality for distance learning (as well as distance teaching) i.e. multiple students with laptops in multiple locations can reach one instructor with two-way high definition audio and video, while conversely one instructor in a remote location could be piped into large K-12, STEM and NCLB class room settings or auditoriums simultaneously. Community Colleges, Universities, Libraries, Hospitals, Health Clinics, and others can have improved skills, awareness, and education. Capabilities for city wide connected real-time video surveillance in public areas can ensure early detection and prevention crime. More solid state data storage, in more public places, will allow police officers, for example, to access to both stored and real-time video of a select location, and in the instance of a crime like child abduction, this in turn would stimulate crime prevention and crime deterrence.

These unlicensed "subnetting" networks are also green and energy efficient simply by the nature of low power emission standards. The FCC can encourage even greater innovation through providing a licensed bandwidth to facilitate quality of connection such as the FCC proposed

AWS-3 ─totally free internet access. Through the use of "Digital Agents" like our proposed HDA in the home, a licensed frequency (always up) connection with limited bandwidth can be used to ensure continuous connection so that the end-user may experience occasional wait times when transporting very large file or large bandwidth transactions, but will never have to suffer some kind of interconnectivity problems due to interference or other bandwidth limiting forces that may occur. The beauty of melding some form of licensed spectrum into the HDA approach is that capacity can be shifted upon demand requirements in the unlicensed spectrum, but connectivity to the end-user can be maintained throughout without interruption or interference in the licensed spectrum.

d. Creating Broadband Success with More Widely Shared or Publicized Commercial Entrants

It should be abundantly clear at this point that the DTFA's recommendations to the FCC are that the Business Models and Practices are far more important to successful development of wireless strategies than any particular technology. This concept now stumbles upon the realization that the FCC is going to have to work this from an "interagency" perspective and take into consideration that the Department of Commerce is the over-arching authority that should be encouraged to show leadership and provide direction in these matters.

A local Director of Contracts (DOC) Organizational Scheme is also the best means to ensure that interests of fair local competition along with uniformity of principles and guidelines are properly carried out. Because more competing resources can be made available to wireless infrastructure projects through outsourcing, a DOC organizational scheme is the best structure when it comes to fast-paced technology.

We know that technology is constantly changing at an alarming pace. The likelihood of a specific technology becoming outdated even before its implementation is becoming common place. Regulatory implementations usually follow. A DOC is the most agile form of organization to be able to jump ─on and not necessarily ─ahead of the curve. The FCC controls only the airwaves, yet the FCC, working through a local nurturing organization can obtain involvement in the business aspects during the entire development process without overstepping its boundaries to help create local wireless digital-tv stations to operate either along side the local digital signal based tv stations. In communities that have local tv, or on its own in communities that may not be large enough to bring in the signal based stations, with greater interaction and more business opportunities, local wireless digital-tv stations can thrive.

Given this exponential pace of change in technology, only a local government DOC is properly formed and agile enough to legally leverage the Recovery Act or other federal or state developmental programs to bring about the evolving Community Mobile Cloud. In addition to grant funds, an exciting and proven securities instrument called the "asset participation contract" can leverage municipal securities including tax increment financing, revenue anticipation notes, industrial revenue bonding, royalty financing, private equity financing, loans, and public donations to provide nurturing and private funding for sustainable growth and technology upgrades.

Initial capital injections like those from federal grants and other resources can serve as the springboard. With subscribers, all future revenue securities instruments with inter-city and inter-State agreements can follow with oversight resting at the community level, but policy making at the federal level.

What the DTFA presents here should be of extreme importance to the FCC because if you are not analyzing government collaboration in telecommunications with private companies with the same vigor as the potential plaintiffs in an antitrust lawsuit, the affect of legal battles could nullify any progress that might be had in developing technologies. Legal battles will destroy wireless projects and no amount of spectrum control can possibly turn around years of litigation over telecommunications and government backed monopolies.

Government Collaboration in Telecommunications has been perhaps the most frequently litigated topic since the Bell System Divestiture of 1982. The Dixie Technology Funding Agency is an example of a Local Government Agency that should be duplicated in other States and cities across the country. In Utah, the entity was formed under Utah (U.C.A. 1953 § 17C-3-1 et seq.) and since its inception has been dedicated to understanding and solving this very legal issue of government collaboration in telecommunications infrastructure. A 600 page thesis on this topic would only begin to scratch the surface of the history and legal precedence in this determination, but under this limited response to your NOI, we simply introduce the DTFA capabilities and persuade the reviewers to truly consider whether the FCC and FTC under their umbrella Department of Commerce organization has thoroughly thought through these legal matters.

Walking headlong into litigation is something that the FCC and FTC must avoid at all costs. Ironically, Federal preemption is a main topic of the legal debate since 1982; any public/private strategic alliances in telecommunications would by definition be bound by any constitutionally correct State telecommunications laws which have been consistently free from Federal Preemption. e.g. *Nixon v. Missouri Municipal League*, 541 U.S.125 (2004).

Under most State law today, local governments can provide public internet and are free to contract with private industries for technology and support; but all of those third party providers must be subject to State money management for competitive bidding, relieving the Department of Commerce of this burden. The DTFA would eliminate possible improprieties within the FCC rulemaking and leave the oversight to the States. And, the DTFA has constructed its own municipal wireless cloud already; currently installed in the City of LaVerkin, Utah, which in an open space laboratory setting utilizes all the technologies spoken of in this response to the NOI.

e. Understanding Tier-1

While local access services are being promoted herein as a great "growth" opportunity, the DTFA is well aware that the internet is and shall remain the key driving force in all broadband and digital commerce.

Tier-1 is herein defined as an IP network that participates in the Internet solely via Settlement Free Interconnection, also known as settlement free peering. The DTFA will require a well connected network with not just back-haul communications between nodes, primary access

points, and network operating centers (NOC) but ultimately high availability to the world-wideweb through either direct or very close ties into Tier-1.

A common point of contention among people discussing Tier 1 networks is the concept of a "regional Tier 1" versus a "global Tier 1." The DTFA primarily seeks a relationship with a vendor who is either included in the incumbent carriers within the United States or will extend their networks to the United States and peer openly with many networks.

For this comment the DTFA encourages the FCC to seek verifiable information, testing, and or recommendations on how local government mobile networks can best to tie into "Tier-1" not just as a "marketing" slogan, but with true performance criteria. For instance, many large telephone companies who are also Tier 1 networks buy, sell, or swap fiber amongst themselves; even if it were possible to list every transaction, it is impossible to know for sure if some of those transactions were required for payment of a peering connection.

The DTFA cannot stress enough the importance of understanding that the bandwidth hogs of high definition (HD) media must be handled on the local access level with all the "segmented capacity" gates on the local access side with all the caching capabilities and other optimizations that will ensure both service quality and quality of service (QoS) which the internet is not yet ready to provide.
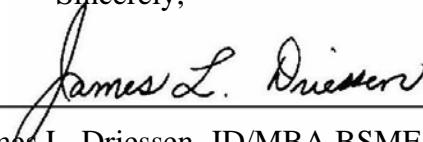
Finally, once these local access networks become the common standard, those networks may then serve as excellent testing playgrounds where even things like the FCC proposed AWS-3 —totally free internet access may one day become reality. The DTFA Director of Contracts structure along with its local government entity (LGE) technology nurturing platform can leverage even more advancements in fostering innovation and investment in the Wireless Communications Market, developing a National Broadband Plan for our future.

Because the DTFA takes a very strong technology neutral position with an absolute "no franchise" approach to any services running on the network, it fosters the greatest amount of open competition for sustained development of new technologies. With this in mind, the DTFA has not been sitting back and waiting for the innovation to come to them. The DTFA has built a first of its kind Ready Community Mobile: evolving real-time subnet IP Cloud; fast roaming 802.11a/b/g/n MIMO(multi-in-multi-out); millisecond handoff; Wi-fi capable, 300+ Mbps bidirectional (fiberless); IP Core VOIP/SIP support; seamless convergence to GSM/CDMA; Gbit backhaul; bridging rural communications to the world with Last-mile triple play; clearer voice calling; and deployment at a fraction of the cost. This all comes as a result of its unique technology nurturing business structure.

The DTFA would ask the FCC not to just keep the information gained in these and other responses only to itself, but to proactively seek out those other agencies under the Department of Commerce and US Department of Agriculture including the Rural Utility Service, National Telecommunications and Information Administration, and Federal Trade Commission to develop coherence in the goals and programs described herein.

Thank you for this opportunity to provide our input. If there is any substantive defect in our submission or in following proper submission procedures, please contact us using the below information and we would like the opportunity to correct it.

Sincerely,

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